

# VIBRATORY DISTRIBUTOR FOR BULK ARTICLES

## TECHNICAL FIELD

This invention relates to vibratory distributor systems for distributing or metering bulk articles, such as bulk food articles, from a moving stream of bulk articles, particularly bulk food items.

## BACKGROUND OF THE INVENTION

The use of vibratory or shaker conveyors or vibratory distributors to distribute or meter bulk articles, such as bulk food articles, has been common for many years. One technique has been to provide proportional gate stations at various locations along the length of an elongated shaker conveyor. Generally, transverse metering apertures are formed in a conveyor bed at each gate station to enable the articles to fall by gravity through the metering apertures into receiving hoppers or storage containers or onto diversion conveyers

Transverse gates are positioned at the gate stations for transverse sliding movement to selectively cover the apertures to restrict or enlarge the effective opening of the apertures to meter the amount or proportion of the articles that are diverted from the main stream at each gate station. Generally the articles that are diverted at each station are taken from a particular lateral segment of the main stream, rather than substantially uniformly across the full width of the main stream. Furthermore, the slide gates and supporting structure extends transversely outward from the side of the vibratory shaker a substantial distance when the gate or aperture is fully open, thereby substantially increasing the effective width of the vibratory shaker.

One of the objects and advantages of the present invention is to provide a bulk article vibratory distributor having one or more gating stations along its length that is able to accurately meter or divert bulk material from the main stream across substantially the full width of the stream independent of the amount of articles being diverted.

An additional object and advantage of the present invention is to provide a bulk article vibratory distributor in which the gate mechanism for opening and closing the gate to divert articles from across the full width of the main stream requires movement far less than the full width of the main stream or conveyor bed.

These and other objects and advantages of the present invention will become apparent upon careful consideration of the following description of a preferred embodiment of the invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of the present invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a fragmentary plan view of a preferred embodiment of a vibratory distributor illustrating a plurality of longitudinally spaced metering gates for distributing bulk articles from a main stream of bulk articles;

FIG. 2 is an side elevational view of the vibratory distributor illustrated in FIG. 1;

FIG. 3 is an end view of the vibratory distributor illustrated in FIG. 1;

FIG. 4 is an enlarged fragmentary side view of one of the gate metering stations shown in FIG. 1;

FIG. 5 is an enlarged fragmentary plan view of the gate station illustrated in FIG. 4 showing a gate metering drive system for selectively moving a gate to enlarge or restrict an opening at the gate metering station;

FIG. 6 is an isolated plan view of a gate;

FIGS. 7-9 is a series of schematic views illustrating the progressive closing of a metering gate, in Which FIG. 7 illustrates the gate fully open;

FIG. 8 illustrates the metering gate partially closed; and FIG. 9 illustrates the metering gate fully closed;

FIG. 10 is a fragmentary vertical cross-sectional view taken along line 10-10 in FIG. 3 illustrating a vibration dampening interconnection between a gate metering drive and a vibrating bed assembly;

FIG. 11 is a fragmentary vertical cross-sectional view taken along line 11-11 in FIG. 7 illustrating a portion of the metering gate; and

FIG. 12 is a fragmentary vertical cross-sectional view taken along line 12-12 in FIG. 7 similar to FIG. 11, except taken at 90 degrees with respect to FIG. 11.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

This disclosure of the invention is submitted in furtherance of the constitutional purposes of the U.S. Patent Laws "to promote the progress of science and useful arts" (Article: 1, Section 8).

A preferred vibratory distributor is illustrated in FIGS. 1 and 2 and identified generally with the numeral 10. The vibratory distributor 10 vibratorily conveys bulk articles, such as food bulk articles, in an evenly distributed article stream past a plurality of metering gate stations 12 to selectively discharge selected amounts of the articles from the stream at each station 12. Depending upon the circumstances, all, part or none of the articles may be discharged at any particular station 12.

The distributor 10 has an elongated supporting frame 14 resiliently supporting an elongated vibratory conveyor bed 16. The supporting frame 14 preferably is an overhead supporting frame on a floor or pedestal supporting frame depending upon the application, location constraints and desires of the customer. The supporting frame, 14 illustrated in the accompanying drawings, particularly FIGS. 1 and 2, is a overhead model that is hung from a ceiling or overhead structure. The frame 14 extends between a front frame end 14a and a rear frame end 14b. The frame 14 is suspended by hangers 15 from a ceiling or overhead structure (not shown).

The conveyor bed 16 is elongated and extends from an infeed end and an outfeed end past the metering gate stations 12. The conveyor bed 16 has a conveying trough 18 with a article support surface 20 that extends laterally between side walls 22 and 24 and longitudinally between the infeed end 16a and the outfeed end 16b.

The conveyor bed 16 is resiliently supported to the frame 14 by support springs 26 that permit bed 16 to vibrate relative to frame 14. In the preferred embodiment, the support springs 26 are inclined leaf springs that cause the conveyor bed 16 to reciprocate at an inclined angle to cause the articles to move upward and forward during each vibration stroke to maintain the articles in an evenly distributed stream with a wide swath between the bed sidewalls 22 and 24 and to advance the articles in a flow direction dictated by the vibrational motion and the configuration of the conveyor bed 16.